

CLAIMS

What is claimed is:

5 1. An orthopedic composition, comprising a homogeneous mixture of a biocompatible polymer and a bioactive particulate ceramic, said ceramic having an average particle size of not more than about 500 nm.

10 2. The composition of claim 1, wherein at least about 30% of said particulate ceramic has an average particle size of not more than about 100 nm.

15 3. The composition of claim 1, wherein said ceramic has an average particle size of about 100 nm.

 4. The composition of claim 1, wherein said ceramic has an average particle size of about 1 nm to about 500 nm

20 5. The composition of claim 4, wherein said ceramic has an average particle size of about 1 nm to about 100 nm

 6. The composition of claim 5, wherein said ceramic has an average particle size of about 1 nm to about 50 nm.

25 7. The composition of claim 1, wherein said composition comprises about 1% to about 49% by volume of said ceramic and about 51% to about 99% by weight of said polymer.

30 8. The composition of claim 1, wherein said composition is comprised predominantly of said polymer.

9. The composition of claim 1, wherein said polymer is selected from a resorbable polymer and a non-resorbable polymer.

5 10. The composition of claim 1, wherein said polymer comprises polyetheretherketone, polyethylene, polymethylmethacrylate, poly(L-lactide), poly(D,L-lactide), poly(L-co-D,L-lactide), polyglycolide, poly(lactide-co-glycolide), poly(hydroxylbutyrate), poly(hydroxyvalerate), tyrosine-derived polycarbonate and combinations thereof.

10

11. The composition of claim 1, wherein said particulate ceramic is selected from bioactive glass and a calcium-containing ceramic.

15

12. The composition of claim 11, wherein said calcium-containing ceramic is a calcium phosphate-containing ceramic.

13. The composition of claim 12, wherein said calcium phosphate-containing ceramic is comprised of hydroxyapatite.

20

14. The composition of claim 1, wherein said homogeneous mixture is obtained by processing the ceramic, the polymer or a combination thereof, with carrier solvents.

25

15. A shaped, article formed from the composition of claim 1.

16. The article of claim 15, wherein said shaped article is a load bearing member.

30

17. The article of claim 16, wherein said member is an intervertebral disc implant.

18. The article of claim 16, wherein said article is shaped to form a structure selected from the group consisting of bone plates, bone screws and a load bearing intervertebral disc implant.

5 19. A bone cement formed from the composition of claim 1.

20. An orthopedic composition, comprising a bioactive particulate ceramic embedded in a biocompatible polymer matrix, said ceramic having an average particle size of not more than about 500 nm.

10

21. The composition of claim 20, wherein said polymer is selected from the group consisting of a resorbable polymer, a non-resorbable polymer and a combination thereof.

15

22. The composition of claim 20, wherein said particulate ceramic is selected from the group consisting of bioactive glass and a calcium-containing ceramic.

20 23. The composition of claim 22, wherein said calcium-containing ceramic is comprised of hydroxyapatite.

24. The composition of claim 22, wherein said calcium-containing ceramic is comprised of a mixture of hydroxyapatite and β -tricalcium phosphate.

25

25. A method for stabilizing a spine, comprising associating with vertebrae of said spine a shaped, load bearing article formed from a composition comprising a homogeneous mixture of a biocompatible polymer and a bioactive particulate ceramic, said ceramic having an average particle size of not more than about 500 nm.

30

26. The method of claim 25, wherein said composition comprises about 1% to about 49% by volume of said ceramic and about 51% to about 99% by volume of said polymer.

5 27. The method of claim 25, wherein said composition is comprised predominantly of said polymer.

28. The method of claim 25, wherein said polymer comprises polyetheretherketone, polyethylene, polymethylmethacrylate, poly(L-lactide), poly(D,L-lactide), poly(L-co-D,L-lactide), polyglycolide, poly(lactide-co-glycolide), poly(hydroxylbutyrate), poly(hydroxyvalerate), tyrosine-derived polycarbonate and combinations thereof.

29. A method of correcting a bone defect, comprising applying to
15 said defect a composition comprising a homogeneous mixture of a biocompatible reinforcing polymer and a bioactive particulate ceramic, said ceramic having an average particle size of not more than about 500 nm.

30. The method of claim 29, wherein said composition comprises
20 about 1% to about 49% by volume of said ceramic and about 51% to about 99% by volume of said polymer.

31. The method of claim 29, wherein said composition is comprised predominantly of said polymer.

25

32. The method of claim 29, wherein said polymer comprises polyetheretherketone, polyethylene, polymethylmethacrylate, poly(L-lactide), poly(D,L-lactide), poly(L-co-D,L-lactide), polyglycolide, poly(lactide-co-glycolide), poly(hydroxylbutyrate), poly(hydroxyvalerate), tyrosine-derived polycarbonate and combinations thereof.

30